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Sprint, Brainstorming, and Design Thinking revisited as methodological strategies to trigger creative and collaborative projects in the classroom

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ABSTRACT. This article highlights part of the research carried out in the professional Master in Education and New Technologies, in a teaching institution and by the research group of a federal public university, which investigate issues related to the design of inclusion and other aspects associated with creative and collective actions for the implementation of interface design projects for applications and podcasts. From a demand to generate new ideas, procedures were applied for this purpose, to supply different educational contexts. The methodology is based on research application, through which researchers adopt collective practices to develop and apply to more creative design proposals or problem-solving (Plomp et al., 2018). After that experience, three procedures or techniques for generating creative ideas collectively were studied and applied: Brainstorming; Design Thinking, and Sprint. In this way, we seek to discuss in this article how procedures to stimulate creativity can serve to engage learners to implement collaborative projects in the classroom or even for different educational needs that seek inter-subjective relationships and interactions. The following authors are highlighted in the theoretical support: Bender (2015); Behrens (2014); Fleith (2001; 2006), Valente and Almeida (2014), Garcia and Czeszak (2019), among others. The results, still preliminary, guide the possibilities of a framework of good practices that align procedures that generate creative ideas, based on the support of active methodologies, for the development of educational projects, as long as the participation of students is considered positive, consistent and engaged.

Keywords: brainstorming; sprint; design thinking; active methodologies; creativity.

Sprint, Brainstorming e Design Thinking revisitados como estratégias metodológicas para desencadear projetos criativos e colaborativos em sala de aula

RESUMO. Este artigo destaca parte da pesquisa realizada no Mestrado Profissional em Educação e Novas Tecnologias, em uma instituição de ensino privada e pelo grupo de pesquisas de uma Universidade pública federal, que investigam questões relacionadas ao design de inclusão e outros aspectos associados a ações criativas e coletivas para a concretização de projetos de design de aulas, interface de aplicativos e de podcasts. A partir de uma demanda de geração de novas ideias, foram aplicados procedimentos para tal finalidade, para suprir diferentes contextos educacionais. A metodologia baseia-se na pesquisa-aplicação (Plomp, Nieveen, Nonato & Matta, 2018), por meio da qual os pesquisadores adotam práticas coletivas para desenvolver e aplicar a propostas mais criativas de design ou resolução de problemas. Após a referida experiência, foram estudados e aplicados três procedimentos ou técnicas para geração de ideias criativas e de forma coletiva: *Brainstorming*; *Design Thinking* e *Sprint*. Dessa maneira, busca-se discutir neste artigo como procedimentos de estímulo à criatividade podem servir para engajar aprendizes à concretização de projetos colaborativos em sala de aula ou mesmo para diferentes necessidades educativas que busquem relacionamentos e interações intersubjetivas. São destacados no suporte teórico os seguintes autores: Bender (2015); Behrens (2014); Feith (2001; 2006), Valente e Almeida (2014), Garcia e Czeszak (2019), entre outros. Os resultados, ainda preliminares, orientam a possibilidades de um *framework* de boas práticas que alinhem procedimentos que gerem ideias criativas, a partir do suporte das metodologias ativas, para o desenvolvimento de projetos educacionais, desde que se considere positiva e consistente a participação dos sujeitos da aprendizagem.

Palavras-chave: *brainstorming*; *sprint*; *design thinking*; metodologias ativas; criatividade.

Sprint, Brainstorming et Design Thinking revisités comme stratégies méthodologiques pour déclencher des projets créatifs et collaboratifs en classe

RESUMEN. Este artículo destaca parte de la investigación realizada en el Máster Profesional en Educación y Nuevas Tecnologías, en una institución educativa y por el grupo de investigación de una universidad pública federal, que investiga cuestiones relacionadas con el diseño de inclusión y otros aspectos asociados con acciones creativas y para la implementación de proyectos de diseño de interfaces para aplicaciones y podcasts. A partir de la demanda de generar nuevas ideas, se aplicaron procedimientos con este fin, para abastecer diferentes contextos educativos. La metodología se basa en la aplicación de investigación, a través de la cual los investigadores adoptan prácticas colectivas para desarrollar y aplicar propuestas de diseño más creativas o para resolver problemas (Plomp et al., 2018) Después de esa experiencia, se estudiaron tres procedimientos o técnicas para generar ideas creativas y colectivamente: *Brainstorming*; *Design Thinking* y *Sprint*. De esta manera, buscamos discutir en este artículo cómo los procedimientos para estimular la creatividad pueden servir para involucrar a los alumnos a implementar proyectos de colaboración en el aula o incluso para diferentes necesidades educativas que buscan relaciones e interacciones intersubjetivas. Los siguientes autores se destacan en el soporte teórico: Bender (2015); Behrens (2014); Fleith (2001; 2006), Valente y Almeida (2014), Garcia y Czeszak (2019), entre otros. Los resultados, aún preliminares, guían las posibilidades de un marco de buenas prácticas que alinean los procedimientos que generan ideas creativas, basadas en el apoyo de metodologías activas, para el desarrollo de proyectos educativos, siempre y cuando la participación de los estudiantes se considere positiva, consistente y comprometida con materias de aprendizaje.

Palabras-clave: *brainstorming*; *sprint*; *design thinking*; metodologias activas; creatividad.

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Introduction

Searches for methodologies, procedures and practices that can be easily accessible, adaptable, and practiced in the classroom are increasingly relevant in the educational field, which are also applied to different educational contexts, to produce more in-depth, collaborative engagement. , valuing the different opinions, self-criticism of students, in addition to aligning common interests, opening up to creative participation with a focus on pedagogical goals.

This certainly occurs because the emerging demands and needs in the educational field are of social and collective interest, to optimize collaborative participation in problem-solving. For this to occur, there must be procedures, techniques, and methodological guidelines that are more adequate and adaptable to such objectives.

For Valente (2005) the main question within the teaching-learning process is how to provide the information and what actions to take so that these are interpreted and converted into knowledge. “Creating learning contexts is extremely important to guide students' actions” (Valente & Almeida, 2014, p. 47). It is up to the teacher to develop pedagogical strategies that promote this form of student engagement to co-author the learning process.

In this sense, a methodological improvement is sought in which it can harmonize, with the new communication and information technologies, theoretical knowledge about how learning is processed, as well as forms of curation, focused on learners, with a dialogical differential of the actions of the students. teachers (Garcia & Czeszak, 2019).

Students, immersed in a digital society, become opinion-emitting poles at the same time they live and are co-authors of information based on their observations and experiences. The school assumes itself as a space for the confluence of these new poles, at the same time that it still faces obstacles in the face of the innovation of its methods in this digital context.

In these cases, for example, the entrepreneurial culture in schools is valued and the potential generated by their community to face difficulties that often go beyond the classroom, as well as the school walls, reaching the needs of everyday life. “Currently, when we refer to schools, teachers, and students, we have to consider that they are part of cyberculture, which is defined as contemporary culture marked by digital technologies and that we are already experiencing cyberculture” (Brito & Simonian, 2016, p. 181).

The actors in the educational process are immersed in a digital society in which access to information is widely disseminated. In this context, students can become poles of opinion emission while living and building information based on their observations and experiences. The school assumes itself as a space for the

confluence of these new poles, at the same time that they still have analog methods and means in the face of a digital society.

Thus, Lévy (1999, p. 172) asserts:

> How to keep pedagogical practices up to date with these new knowledge transaction processes? This is not about using technologies at any cost, but about consciously and deliberately accompanying a change in the civilization that profoundly questions the institutional forms, mentalities, and culture of traditional educational systems and, above all, the roles of teacher and student.

Thus, it can be seen that innovation in the educational context constantly pursues the expansion of didactic and methodological possibilities. Based on the numerous problems in the field of education, it can be seen that they require immediate solutions, especially those that can ensure inclusion, equity, and quality, as well as lifelong learning (United Nations Educational, Scientific and e a Cultura [Unesco], 2015), educational proposals that can merge with increasingly accessible technologies and that meet demands that lead to high fluency and literacy for these students.

These movements are irreversibly marked by digital communication and information technologies that also require creative approaches. According to Valente and Almeida (2014), the possibility of learning at any time and place has aroused the interest of education professionals and other professionals involved with this context, thus making it necessary to understand how to relate what has been created to the formal educational environment and the improvement of results with such actions. We agree with Gilberto and Franco (2011) when they state that only in teaching practice, as praxis, subjects, and realistic dialogue and transform, and are transformed by it.

There is a change in the profiles of students who have technological mobility, practice digital games daily, work together with gamified activities, use social networks, participate in the continuous technological dynamics in the social context, so that they are affected by such contexts and practices. Consequently, these still need to be better prepared, or 'cured', to face a changing world (Garcia & Czeszak, 2019).

These aspects, when aligned in the educational context, produce different expectations, as the actors of the teaching and learning processes need to build an environment for the use of technologies by applying different methods, paying attention to rhythms and personalized forms of teaching, promoting mastery of methodologies and/or procedures, within a possible dynamic of exchanging experiences and new combinations, but delving into a differential that values such actors. "For a teaching practice to be pedagogical, it needs to go to the source, be guided by Pedagogy, constitute itself as praxis, action-reflection-action, intentional, critical action, and contextualized in the society that makes it immerse" (Araújo, 2019), p. 282). In this case, the dialogic issue in the ways of teaching and learning has never been so requested as in contemporary times.

The global challenges that young citizens will have to face shortly are still unclear, however, it is known that they will have to be prepared to deal with uncertainties and demonstrate high use of technology, in addition to going through intellectual challenges, including approaches that bring pleasure and socio-emotional skills to reach personal goals. There are numerous new life challenges, which cannot yet be foreseen (Morin, 2011; Filatro, 2019).

However, today's apprentices are, on the one hand, inserted in a highly technological world and, on the other hand, in the training school environment, they lack incentives, they do not need practices that trigger their productions, contributions to face continuous uncertainties, the unpredictability, the loss of consistency for the future, the need to learn to live and live together (Morin, 2011). One of the ways out is to work on your creativity differential, to meet such demands, both related to the real world and with frequent changes, as well as those that are still unknown.

There are already widespread techniques and procedures to explore people's creativity, practiced in the corporate environment and which, due to their characteristics, produce good results in terms of mobilizing learners in the face of a challenge (Cavalcanti & Filatro, 2017; Knapp, Zeratsky, & Kowitz, 2017).

In this study, procedures that demand more creative contributions from students are discussed, harmonizing with methodological approaches that consider them more participatory and interactive in the learning process. The focus is to produce a concrete response in terms of training that awakens co-participation, co-authorship, the collective aspect, and, above all, respect for what is diverse and different in terms of opinions, when building a project. Therefore, the subject of creativity, in its differentials of pedagogical, scientific, and practical projects, is rescued in this article, seeking to recognize renewed pedagogical dialogues to glimpse ways that can articulate new ideas produced by the learners.

Innovating in the school environment

Innovating in the school environment must mean positive changes that can satisfy both teachers and students, at different levels of training, aiming at the formation of conscious citizens who relate not only to their reality but also to their intellectual potential to make adequate and sustainable propositions.

However, innovating in education is a task that still requires continuous efforts, based on the interest in developing new applications, skills, expansions, recognizing the contexts and needs, in addition to the use of appropriate, personalized, and adaptable technologies. diversity of current contexts (Morán, 2017).

The engagement of students, which is so much desired, depends on several factors, among them is those related to the methodologies applied in activities at the school that require attention, guidance, curatorship, dialogic exchanges, as the school is increasingly led to tune in with educational projects, which have become more supportive, more community-based, more experimental and connected with reality, in a way that requires creative behaviors.

For Garcia and Czeszak (2019, p. 87):

> Theoretical studies developed in recent decades have already highlighted the capacities related to reflection, practices of dialogue, and appreciation of negotiation, seeking to create environments for better learning. From this stems the intellectual and human value of the learner, creating voices and possibilities for action.

In this way, the renewed pedagogical discourse focuses on the possibilities for the student to become a more participative being, being guided to use and expand his repertoire of competencies and abilities, working on his different levels of protagonism, with exposure and respect to divergent opinions. Thus, it is necessary to broaden the horizons regarding the use of active methodologies through digital technologies and not stick to what is in 'fashion' today (Valente, Almeida, & Geraldini, 2017)

Different contemporary studies indicate that the challenges of the modern world can be faced soon, if the current school works on skills that can promote more adaptive possibilities to renewed situations and the solution of new problems (Alencar & Fleith, 2010; Zabala & Arnau, 2014). ; Abed, 2016).

For Abed (2016, p. 9)

> I argue that it is up to the school institution not only to maintain the framework of knowledge accumulated in the history of ivilization but also to develop thinking, creative beings, builders of knowledge, who know how to relate to themselves and to others, committed to building a better world.

It appears, therefore, that there are still difficulties in establishing organizational processes in which theoretical aspects that lead to learning are balanced, using active methodologies, while students can deepen their ideas and contributions to achieve more. motivation to learn.

One of the methodological alternatives is to work on educational projects, insofar as their actors are focused on creative possibilities for solving new and old problems, as well as meeting their learning interests.

> A convivência nos espaços híbridos multimodais da hiperconexão provoca mudanças nos modos de interagir, representar o pensamento, expressar emoções, produzir e compartilhar informações e conhecimentos, assim como aporta nvos elementos à aprendizagem, podendo trazer novas contribuições e desafios aos processos educativos (Valente et al., 2017).

Araújo, Ribeiro, and Pinheiro (2016, p. 98) point out that, for some scholars, contemporary society is defined as "[...] of learning [...]" and/or "[...] of knowledge [...]", mainly as a result of the speed and intensification, thanks to the use of digital information and communication technologies, as instruments for the socialization of knowledge. Students, even when more aware of their responsibilities, with more fluency in terms of using different digital technologies, still need guidance and curatorship so that they can extract creative proposals from themselves, so that they can ally themselves with the demands of their groups, working in a more focused on collaboration and collective intelligence.

In this sense, according to the results of practices supported by the aforementioned research group, different techniques and procedures can be applied so that creative proposals can emerge, respecting opinions, the construction of arguments, with weightings based on research, representing active participation. These processes will be able to guarantee more sustainability in terms of facing the world, as they are also based on skills and socio-emotional competencies for life.

> If we want students to be proactive, we need to adopt methodologies in which students engage in increasingly complex activities in which they have to make decisions and evaluate results, supported by relevant materials. If we want them to be creative, they need to try new possibilities to show their initiative (Morán, 2015, p. 17).

Thus, it is justified to bring collaborative possibilities to the educational scope, which work with different visions in search of a common goal, covering, for example, procedures such as *Design Thinking*[1], *Sprint*[2] , and *Brainstorming*[3].

The focus now addressed concerns the differentials of project construction, in which one can explore both the choice of theme, the definition of the question that can anchor the students' research, as well as stimulating proposals for solutions to problems, or any other form of educational activity that demands the creative voice of students, choices, decision-making and construction of a learning path.

Creativity

Creativity has been studied for more than half a century and its studies have intensified in the last decade (Fleith, 2001). In this path, we can currently highlight the need to endow human beings with creative skills to go beyond machines, program artificial intelligence, in short, challenge themselves in their ways of producing, and proposing bold solutions.

The interest in creativity as a scientific area became more relevant mainly from the 1950s onwards. Table 1, based on Feith (2001; 2006), as well as on Giglio, Wechslere, and Bragatto (2009), illustrates how studies on creativity were carried out in the scientific area.

Table 1. Studies on creativity.

Period of studies on creativity	Study objectives	Leading scholars
From 1950 to 1960	Identify creative thinking skills and personality traits related to creativity	Barron, 1995; Guilford, 1967 apud Fleith, 2001;
From 1960 to 1970	Deepen ideas about the creative potential of individuals, also focused on the school context, with criticism of what could inhibit students' creativity. Thus, the central point is to work on the development of strategies for the production and creative individual expression.	Maslow, 1968; Rogers, 1961; Torrance, 1966; Wallanch and Kogan, 1965 apud Fleith, 2001
From 1970 to 1980	Research that sought to investigate cognitive processes, as well as how they influenced the social context in human development. The process and development of creative thinking and how variables in the social context could affect this process were also a focus of research during this period. The studies also focused on how the creative act was manifested.	Fleith, 2006
From 1980 to 1990	Creativity studies start from a view not only as an individual phenomenon but as a systemic process. In this sense, to value creativity, it is important to consider the influence not only of the family and school environment but also of the social and cultural environment and the historical moment.	Amabile, 1996; Feldman, 1994; Gardner, 1993; Gruber e Davis, 1988; Simonton, 1994; Csikszentmihalyi, 1996 apud Fleith, 2001
From 1990 to today	Studies on creativity gain space for problems related to learning at different levels and environments. One can cite the work "From creativity to innovation", which covers themes such as styles of thinking and creating; implications of creativity in leadership; creativity for conflict mediation; among other subjects.	Giglio et al. (2009)

Source: based on Fleith (2001) and Fleith (2006); Giglio et al. (2009) and adapted by the authors themselves.

For Alencar and Fleith (2010, p. 3, emphasis by the authors): "[...] creativity must be understood not as an individual phenomenon, but as a systemic process. The most important thing, then, is to investigate 'where is creativity' and not 'what is creativity"". These authors are based on the formulations of Csikszentmihalyi (1999 apud Alencar & Fleith, 2010, p. 3): "[...] creativity does not occur within individuals, but is the result of interaction".

Such aspects lead to the following reflections on creativity for the school context:

1) Creativity can be encouraged and built-in certain contexts and conditions;

2) Creativity depends not only on individual conditions but also on collaborative and collective issues.

3) Creativity can become a common practice, incorporated into educational activities, as long as it is based on a pedagogical approach that values it among students.

4) Creativity can be understood as a human potential to overcome new challenges and demands of today's society.

5) Creativity is a rearrangement of what we already know to define what we don't know.

[1] Design Thinking benefits from capabilities we all have, but which are neglected by more conventional problem-solving practices. This is not just a human-centered proposal; she is profoundly human by nature. Design Thinking is based on our ability to be intuitive, to recognize patterns, to develop ideas that have an emotional meaning as well as a functional one, to express ourselves in media beyond words or symbols (Brown, 2010).

[2] Sprint is a unique five-day process to resolve critical issues through prototyping and testing ideas with customers. It's like a collection of the 'greatest successes' from strategic management, innovation, behavioral sciences, design and more all condensed into a step-by-step that any team can use (Knapp et al., 2017).

[3] Brainstorming is part of the process that encompasses all possible conjectural ideas, such as solutions or directives for other ideas that, in turn, may lead to the solution. The more ideas we conjecturally conceive, through alternating possibilities, the more likely it is to hit one or more that solves the problem for us (Osborn, 1987).

> Creativity, finally, understood in itself, is the ability to mentally form ideas, images, and things that are not present, or to give existence to something new, unique, and original, but with a purpose. Creation itself, therefore, is different from creativity. This is equivalent to saying that, when one is purposefully creative, the search for solutions is not based either on the fragility of fantasy (which has no restrictions) or only on the ease of imagination (which works reproductively even without giving it an objective) (Duailibi & Simonsen Jr., 1990, p. 15).

In this sense, we argue that, methodologically, techniques or procedures can be applied so that students acquire creative skills.

The collective, interactions and the social brain

Among several other aspects related to creativity, it is worth mentioning its relationship with the collective, with the different forms of interactions, with people and with the world, supporting collaborative activities. In this path, it is worth emphasizing the concept of the social brain.

According to Goleman (2019), the social brain is related to what is meant by 'social neuroscience'. The author is based on studies by Cacciopo and Berntson, carried out at the end of the 20th century, who stated that social behavior was very complex and that, therefore, it was difficult to incorporate it into their studies. However, after further research, these same authors managed to review these principles and came to accept the fact that the social world can influence the brain as well as human biology. Thus, remaining from the aspects of the collective and interactions, the social brain fits as:

> [...] a sum of the neural mechanisms that orchestrate our interactions, as well as our thoughts and feelings about people and our relationships [...] in tune with the internal state of the people we live with, and, in turn, is influenced by it (Goleman, 2019, p. 18).

This is in line with the recognition of cognitive demands related to the creative subject, which, according to other studies, involves concentration on the problem, quick and objective reasoning, interest in the subject, expression of positions, among other aspects (Alencar & Fleith, 2010).

However, the school environment can be, on the one hand, both stimulating, when teachers and educational approaches provide spaces for creative exercise, on the other hand, and inhibiting, when participation with new ideas is not required from students for the construction activities, lacking encouragement to the student's voice.

In this way, the exercise of creativity can also be seen as a process that opens up to the 'Creative Productivity Model', idealized by Renzulli (1992 apud Fleith, 2001). Thus, the author suggests:

> [...] intervention strategies in the school environment, which will lead the student to explore new areas of knowledge, to develop cognitive skills, to have a positive self-concept, to participate more effectively in classroom activities, and to discover new interests and potential. . Rather than simply reproducing knowledge, the student is encouraged to creatively produce knowledge. This model also provides the teacher with suggestions for pedagogical practices and examples of classroom attitudes that can contribute to the development and expression of creative behaviors in their students (Fleith, 2001, p. 25).

The promotion of activities, based on a pedagogical plan that stimulates the student's creative potential, must be understood as an important presupposition for the access and production of knowledge.

Methodology: procedures **to stimulate creativity in participating in projects**

As a methodology of this study, three procedures were highlighted and applied that can be used to stimulate more creative actions in the learners in the classroom. These procedures are supported by assumptions of active methodologies, which demand positions, decision making, exchange of opinions, critical thinking, participation in other more collaborative intellectual activities, among others. This is related to the contribution of new ideas related to recent problems, as well as to old problems, as shown in Tables 2, 3, and 4.

Brainstorming consists of a methodology that leads the student to explore their repertoire of words, opinions, experiences, or ideas, taking into account their agility. The teacher acts as moderator and opens space in the room for participants to contribute as ideas from a defined problem arise. Design thinking is associated with problem-solving, that is, the teacher launches an idea-generating problem, students must think about its causes, seek new references, talk to those involved, if possible, to gather more information and, after listing what is essential and focused, they must bring such ideas to solve it. In the Sprint, the challenge is launched and the students begin to negotiate possible solutions. Thus, based on their knowledge and also in-depth research, they must bring proposals

that can contribute to solving the problem while everyone can, naturally, interfere with their colleague's proposal. The teacher acts as a moderator, promoting the negotiation of parts or the entirety of these options.

Table 2. *Brainstorming*.

Procedure	*Brainstorming*
Descriptive	It can be seen as a pedagogical strategy and applied insofar as new subjects are dealt with at school and require contextualization, new ideas, and the definition of unconventional paths to achieve clear needs.
Goal	Explore new skills, creative contributions, from a focus that lacks bold solutions, while students are prepared to respect diversity, the opinion of others and expose opinions, considering their experiences and their knowledge. In this procedure, at first, the divergent opening of ideas must be worked on. In a second moment, one must filter, select and work on convergence strategies, to arrive at the joint solution.
Implementing	1) The teacher will act as a moderator and someone who explains to the students how this technique works and what goal it is expected to achieve. 2) It should bring together students in an environment where everyone can be well distributed and where their contributions and those of other participants can be seen. 3) Students should feel comfortable, not feeling pressured to be creative in their answers, but rather stimulated in their imagination and gaining the pleasure of thinking. 4) Students must have equal opportunity to speak out. 5) Presentation of a problem or joint definition of a problem, through questions directed to students. 6) Contributions must be noted and visually accessible to those present. 7) There must be a voice for everyone to participate, as well as all ideas must be noted so that they are considered and evaluated together.

Source: authors themselves.

Table 3. *Design Thinking* - contribution with new ideas to old and new problems.

Procedure	*Design Thinking*
Descriptive	The technique of collective raising of ideas, seeking the creation of a product, of an object, solution of a problem, concretizing an idea, for example, from the 'maker culture', or entrepreneurship, or even a problem that affects beyond the school walls, such as potholed streets, lack of security, development of a healthier food menu.
Goal	To explore real possibilities to realize an idea, make a prototype, test it, and put it in the world to be used and improved.
Implementing	The teacher should guide you through the following steps: 1) Understand the problem, and therefore seek a process of empathy with students about it; 2) Observe the contextualizations of the problem, bring references, bring examples and research sources; 3) Define what will be done as a result of this observation; 4) Create, ideate, draft an idea, put it on paper, compare, look for improvements to reach the prototypes; 5) Prototyping – basing the 'maker culture', in concrete construction processes of ideas; 6) Test – make the prototype to be tried, criticized, analyzed in its positive and negative points and if it reaches its objective; 7) Take lessons and improve what was not good; 8) Conceptualize the learning achieved; 9) Validate the improvements and complete the project; 10) Disseminate the product – make more people access and experience the product, as a result of what had been achieved through original and collaborative ideas.

Source: the authors, based on Cavalcanti and Filatro (2017); Torquarto, Lapolli, and Willerding (2015).

Table 4. *Sprint* - contribution with new ideas, with a very clear focus that demands a solution.

Procedure	*Sprint*
Descriptive	Procedure for using collective intelligence to raise new ideas developed at the corporate level (Knapp et al., 2017). It is also aimed at providing creative solutions in the short term, using surveys of ideas.
Goal	To explore new skills, creative contributions, from a focus that needs concrete solutions.
Implementing	1) The teacher must lead the interaction with the students. This practice is interactive and has an organization and negotiation factor. One can negotiate the problem to be solved with the solutions generated jointly. 2) It is important to work on a visual instrument so that everyone can participate and monitor the contributions of each one. The use of post-its can be indicated, these being colored, in which students write their ideas and paste them on the board, for example, for everyone to see. 3) The ideas presented will be organized by the teacher in similar areas, so that many will be discarded. 4) The teacher can act as a moderator, and other students can also give their opinion, positioning themselves as a filter, helping to choose a more suitable path. 5) Thus, once the idea is chosen, the prototype phase begins to be thought of, also based on planning, also carried out collectively. 6) Once the prototype has been developed, potential users will be asked to give immediate feedback to see if the idea has the possibility of succeeding or not for a greater number of people.

Fonte: os próprios autores, baseados em Knapp et al. (2017).

Active methodologies, projects, and creativity

Active methodologies are pedagogical proposals, developed from theoretical assumptions that place the learning subject as active, who works on cognitive processes, feeling capable of giving their opinion on different issues that emerge in their learning, as metacognition. They are inspired by studies developed by Piaget, John Dewey, Carl Rogers, and other learning theorists.

According to Mill (2018, p. 441):

> The adoption of active methodologies aims to actively involve the learner in activities that help to relate to the context in which he is inserted, to develop cognitive strategies, and to leverage the knowledge construction process, making the teaching-learning process more personalized.

Moran (2015) understands that the teacher's role, from the perspective of active methodologies, is to guide students so that learning objectives are more clearly achieved. It is suggested that the teacher, in this case, proposes pedagogical actions, which can guarantee that students become active in the construction of knowledge. Thus, this student can be led to become more aware of what and how he learns, how to produce connections, how to overcome challenges, how to use resources, own skills, among other aspects.

For such processes to be triggered, creativity is a relevant path, as students are asked to participate in projects, proposing new solutions, perspectives, in a collaborative way. In this aspect, your self-esteem as an active participant also rises.

Bender (2015) understands the educational project in the school environment as a methodology oriented to problem-solving learning (PBL – Problem-Based Learning), anchored in situations to be experienced with students, bringing lessons through reflection and practical actions. In this sense, a space for creative propositions is opened. "By using authentic and realistic projects, based on a highly motivating and engaging question, task or problem, to teach academic content to students in the context of collaborative problem-solving work" (Bender, 2015, p. 15). Thus, the aforementioned author lists some steps that can be part of educational projects, as shown in Table 5.

Table 5. Key features of the ABP.

Project steps	Description
Anchor	Provide basic information provided by the teacher to generate student interest.
Cooperative work	Guide students to work in groups, checking each one's abilities.
Driving question	Bring a fact or situation that is worked on to get the attention of students, in terms of seeking to know more.
Research and innovation	Guide students to do research, based on the issues previously raised.
Evaluation	Promote opportunities for students to reflect on the learning process, what they thought was good, or what could be improved during and after the project.
Results presentation	Ask students to present the results generated and look for the best way and language to present them.

Source: the authors, based on Bender (2015).

Discussion of creative elements required by projects

Observing each of these steps, surely, a creative element is identified, which will guarantee the success of the educational project. To this end, Behrens (2014) also highlights some essential elements of the projects worked in the classroom. In this case, it is suggested that the teacher prepare a work plan and present it to the students, with a negotiating and guiding purpose. Some suggestions for steps to be taken: i) what the learning process with projects will be like; ii) how to define problematization and contextualization; iii) how topic surveys should be carried out and their choice; iv) how and what available resources will be involved; v) what will be the evaluation criteria chosen; vi) indication of research paths, with resources, bibliography, and links.

From the implementation of these steps for the development of projects, some creative demands for the students' actions can be identified. At this point, you can apply one of the procedures in the classroom, such as Design Thinking, Sprint, and Brainstorming.

1) First creative demand: choice of theme, whose contributions must have some form of negotiation, a dialogue between professor and students, aiming at defining the theme to be worked on in the project. Students' previous experiences with certain topics should be explored, as well as discussing further research with references from searches, bibliography, websites, etc.

2) Second creative demand: problematization – at this moment the challenges of conducting the project are worked out, in which case the teacher must assume the role of mediator and work with the students in filtering ideas. The definition of problematization is what will give the project a differential to be worked collaboratively. The problem is that it drives the search for a solution over the search.

3) Third creative demand: contextualization – at this stage students must locate the research problem historically, connecting to the current world. This contextualization must be done through experiences, experiences and shared among the participants.

4) Fourth creative demand: individual research – the student will present effective results of their research, demonstrating the creative choices they made to achieve their results. At this point, the teacher should guide students not to make copies of news, but to ponder the information found. It is also important to educate for discernment regarding fake news (Garcia & Czezark, 2019).

5) Fifth creative demand: individual and collective production - aiming at the final product - here students are encouraged to produce their content that will be aggregated with others of their teammates, and make the decision about what can be used and discarded, understanding the objectives to be achieved. In this case, depending on the project, requirements for prototyping can be worked out, such as, for example, the maker culture, using a 3D printer, application editor programs, among others.

6) Presentation of the production: the production, which can be a prototype, must value the results, seeking informational quality, good resources, and adequate language. A new creative space for choices opens up, about the best languages and resources in search of reaching the goal.

7) Evaluation: this must be both relative to the product itself and the process, encompassing their experiences, achievements, obstacles, and experiences in their conduct. This process can also receive creative influences from students, in which evaluative rubrics can be operated (Garcia & Trujillo, 2018), as well as the observation of the depth of the research, quality of the results, among other aspects.

8) Improvements – will occur from the evaluation, with the absorption of critical views and improvements for the next steps.

Final considerations

This study, extracted from broader research, which in this focus tested and analyzed some methodological procedures, already practiced and recognized within organizations, such as Brainstorming, Design Thinking, and Sprint, found that these can also be practiced in a school environment, the insofar as they promote opening creative spaces for students, in project construction activities, as long as there is a clear appropriation of the meanings and purposes that lead to the practice of such procedures.

One of the positive aspects of these procedures is the encouragement of participation in projects, expanding the vision of the purposes of the proposed activities within the school routine, making them clear to everyone. Hence, the value of the dialogic assumption can be recognized, which involves assigning spaces to express opinions, interact and assume responsibility for participation, based on a welcoming and at the same time critical environment, increasing the participatory sense of the learners.

Education professionals, when opting for the use of active methodologies, enable creative participation on the part of the students, providing the opportunity to carry out movements for the exchange of knowledge in the teaching and learning process. They make room for different sources of information and dialogue with the new desires and needs of contemporary education.

The referred procedures in the worked dimensions require different unfoldings, regarding the product, its prototyping, its testing, its validation, always depending on the extension of the current project. They can also enable a clear exercise of communication with groups, with peers, in the monitoring of the process, in the improvement of interpersonal communication.

However, the school environment, in which these actions take place, must build a harmonious educational project, which supports approaches, forms of dialogue, feedback, evaluations, and mentalities that are open to the voice and participation of students, aiming to prepare them, with self-esteem for criticality, research, argumentation and sense of participation.

In the same way, the research results show us which attitudes and mentalities should be changed so that creativity can pass from the condition of a methodological differential to a practice of pedagogical quality, common to the proposed activities, which means giving voice to the student. , understand its limits and openings in the application.

These processes can produce a bridge between the future, uncertain reality, full of doubts, and the formation of individuals in contemporary times. One of the important aspects to be highlighted is to make the teacher believe in his power to promote joint actions with his students, keeping himself in the position of leadership, guidance, moving meaningful learning, which places students as active subjects, co-authors in the construction of their learning.

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